Acute kidney injury in low-income and middle-income countries: no longer a death sentence

See Articles page e242

Acute kidney injury is a common disorder worldwide, occurring in more than 13 million people every year, 85% of whom live in low-income or middle-income countries (LMICs).[1] The disease imposes a severe burden of morbidity and mortality, with a major economic effect on health-care expenditure worldwide, especially in low-resource settings.[2] Children and young adults in LMICs are disproportionately affected by acute kidney injury as a result of infections, volume depletion due to severe diarrhoea, pregnancy-related events, or animal envenomation.[3] Tragically, people continue to die in large numbers in low-resource settings as a result of this disorder, which in many cases is preventable and potentially treatable with simple measures. Individuals with acute kidney injury who progress to the stage at which renal replacement therapy would be indicated die because dialysis is simply not available or affordable. This is unacceptable because patients have an excellent chance of survival when the kidney is given enough time to recover and life is sustained by dialysis. Unfortunately, few epidemiological data exist for outcomes of acute kidney injury in LMICs, which makes it difficult to describe the context of this disorder in these countries.

This shortcoming is highlighted well in the study by Olowu and colleagues[4] in *The Lancet Global Health*. This systematic review of acute kidney injury, with a focus on sub-Saharan Africa, documents that, in 3340 patients admitted to hospital with acute kidney injury in 13 countries in the region, the disorder was severe in most cases, with indications for dialysis in 66% of children and 70% of adults. However, only slightly more than half of children and a third of adults received dialysis when required.

Although the studies analysed were low quality, these findings confirm what has been reported in other LMICs worldwide. Indeed, one concern in LMICs is that people often present to hospital or large referral health-care centres late, which suggests more severe acute kidney injury at admission, a greater need for dialysis, and an increased risk of death compared with higher-income countries. Since acute kidney injury is not associated with any specific symptoms, and diagnosis is largely based on laboratory measurements, which are rarely available in remote areas, it often goes unrecognised during a first examination by non-specialist health-care providers. Caregivers in the community might not have the knowledge for early recognition, timely intervention, and effective follow-up. Thus, training primary care physicians and other health-care givers to raise awareness, share knowledge, and provide practical management of acute kidney injury is imperative in LMICs, where nurses and allied health personnel should also play a key part in building the workforce to recognise and care for people with acute kidney injury. This role is particularly important since the density of physicians is 0·02–0·29 per 1000 people in many African countries, ten to 100 times lower than the WHO target.[5]

The study by Olowu and colleagues also showed that roughly 80% of children and adults with acute kidney injury in sub-Saharan Africa who required, but did not receive, dialysis die.[4] Major barriers to access to care were erratic hospital resources and out-of-pocket costs. Dialysis treatment is often thought to be too costly and complex to be delivered in low-resource settings. In low-income, and often in middle-income, countries, renal replacement programmes are only accessible in large cities, usually only for patients who can afford to pay for treatment,[6] and are often not situated in acute care hospitals. Thus, patients who develop acute kidney injury and are in need of dialysis support often die. Dialysis might reduce mortality related to acute kidney injury in resource-limited settings, but acute haemodialysis is not easily affordable because of the high cost of machines and consumables, unreliable electricity and water supplies, and scarcity of trained personnel. By contrast, gravity-driven peritoneal dialysis is a more realistic option because renal replacement therapy can be delivered without machines and electricity, relying only on consumable supplies, and thus reducing costs and complexity in low-resource settings.[7] Although particularly useful in areas with fragile health infrastructure, peritoneal dialysis is underused in most parts of the world, despite advantages such as reasonable costs (as little as US$150 to save one life) in remote locations.[8] This approach is feasible,

as documented by encouraging results from ongoing peritoneal dialysis programmes for acute kidney injury in selected centres in Africa and Asia.[9]

People in LMICs are disproportionately exposed to severe acute kidney injury and have substantially less access to effective treatment than do people in higher-income countries. Framing acute kidney injury as a driver of substantial inequity in disease risk and mortality in low-resource countries, the International Society of Nephrology has created and launched the multifaceted human rights programme 0by25, which advocates that no-one should die of untreated acute kidney injury, with a focus on LMICs in Africa, Asia, and Latin America.[10] This ongoing programme encompasses building human capacities through education and training at all levels of health-care systems, coupled with making point-of-care acute kidney injury diagnostic tools and management of acute renal failure available at a low cost.[2] However, the success of this and other initiatives ultimately rests on the capacity of national health authorities to adopt and ensure the sustainability of acute kidney injury programmes, making access to acute renal replacement therapy with dialysis affordable for those in need, with the hope of substantially curtailing mortality associated with treatable acute kidney injury in LMICs worldwide, including sub-Saharan Africa.

*Norberto Perico, *Giuseppe Remuzzi*
IRCCS—Istituto di Ricerche Farmacologiche Mario Negri, Bergamo, Italy (NP, GR); Department of Medicine, Unit of Nephrology and Dialysis, ASST—Papa Giovanni XXIII, Bergamo, Italy (GR); and Department of Biomedical and Clinical Sciences, University of Milan, Milan, Italy (GR)
giuseppe.remuzzi@marionegri.it

We declare no competing interests.

1 Lameire NH, Bagga A, Cruz D, et al. Acute kidney injury: an increasing global concern. *Lancet* 2013; **382:** 170–79.
2 Mehta RL, Cerda J, Burdmann EA, et al. International Society of Nephrology's 0by25 initiative for acute kidney injury (zero preventable deaths by 2025): a human rights case for nephrology. *Lancet* 2015; **385:** 2616–43.
3 Mehta RL, Burdmann EA, Cerda J, et al. Recognition and management of acute kidney injury in the International Society of Nephrology 0by25 Global Snapshot: a multinational cross-sectional study. *Lancet* (in press).
4 Olowu WA, Niang A, Osafo C, et al. Outcomes of acute kidney injury in children and adults in sub-Saharan Africa: a systematic review. *Lancet Glob Health* 2016; **4:** e242–50.
5 Kinfu Y, Dal Poz MR, Mercer H, Evans DB. The health worker shortage in Africa: are enough physicians and nurses being trained? *Bull World Health Organ* 2009; **87:** 225–30.
6 Couser WG, Remuzzi G, Mendis S, Tonelli M. The contribution of chronic kidney disease to the global burden of major noncommunicable diseases. *Kidney Int* 2011; **80:** 1258–70.
7 Ponce D, Berbel MN, Regina de Goes C, Almeida CT, Balbi AL. High-volume peritoneal dialysis in acute kidney injury: indications and limitations. *Clin J Am Soc Nephrol* 2012; **7:** 887–94.
8 Prabhu MV, Subhramanyam SV, Sinoj KA, Nayak KS. Manual acute PD with rigid catheters—a relook. *Open Uroland Nephrol J* 2015; **8:** 31–38.
9 Kilonzo KG, Ghosh S, Temu SA, et al. Outcome of acute peritoneal dialysis in northern Tanzania. *Perit Dial Int* 2012; **32:** 261–66.
10 Remuzzi G, Horton R. Acute renal failure: an unacceptable death sentence globally. *Lancet* 2013; **382:** 2041–42.